

to the separation of its parts is called tenacity.

Plasticity.—Place a stick of sealing wax near the edge of a table so that one end projects beyond the edge. Place a weight on the end to hold the stick from falling, and on the projecting end place a small weight and leave for some time. On removing the smaller weight, the stick of wax will be found permanently bent. This property of bending under a continuous force is called plasticity.

4. (a) Place a clean, dry sewing needle on water and it will be seen to float. The needle is held on the surface of the water by the force of surface tension.

Water dropped on a piece of plate glass takes a rounded shape at the edge, due to surface tension.

A mixture of alcohol and water can be made in which a drop of oil will float wholly immersed. While floating in this way the oil will assume a spherical form, due to surface tension.

4. (b) Weigh the body in air and then weigh it wholly immersed in the liquid, and the difference of the two weights represents the buoyant force of the liquid on the body.

5. (a) Weigh the cork in air and let the weight be x grams. Weigh a sinker in water and let its weight be y grams. Weigh the cork with the sinker attached, both wholly immersed in water, and let the weight be z grams. Then the weight of the cork alone in water would be $(y - z)$ grams. Therefore, the loss of weight of the cork in water would be $[x - (y - z)]$ grams. Therefore the specific gravity

of cork would be
$$\frac{x}{x - (y - z)}$$

A piece of wood weighs 12 grams in air, a piece of lead weighing 20 grams in water is attached to it, and the two weigh in water 18 grams. Therefore, the specific gravity of wood is

$$12$$

$$\frac{12}{12 - (18 - 20)} = 3.$$

5. (b) Take two beakers, into which put water and alcohol respectively. Take also a long U-shaped tube with an opening at the bend and attachment to allow a rubber tube connection with the air pump. Stand the U-shaped tube vertical with an open end of it dipping into the different liquids. Exhaust the air from the U tube, and the water and alcohol will rise in their respective tubes. We then have equal weights but different volumes. Their specific gravities will be inversely as the heights of the columns.

6. (a) Wind a wire tightly around a wooden cylinder, and then heat. The wire will become quite slack, showing that it has increased in length.

Take a piece of sheet iron and place it before four fixed supports, one on each side. Apply heat to the iron and it will press the supports outwards in both directions, showing that it has expanded in surface.

Take an iron ring which will just allow an iron ball to pass through. Heat the ball and it will no longer pass through the ring, showing that it has expanded.

6. (b) The compound bar expands and takes a curved shape with the brass on the convex side and the iron on the concave. The experiment shows that metals expand on the application of heat, and that some expand more than others.

7. Take a Florence flask, and a cork with two holes in it, through which may be passed a small tube and a thermometer. Fill the flask with water and then put the cork in tightly and the water will stand a certain distance up in the small tube. Surround the beaker with broken pieces of ice, and after a while the water